## REMARKS

At page 3 of the Office Action the Examiner states, "Thus it is deemed that the applicant acknowledges that the use of fluorine compound gas would have been obvious." For the record, applicants make no such acknowledgement.

**The Rejections Under 35 USC § 103**

The claims were rejected as allegedly unpatentable over a) Fujiwara (alone or in view of Hiraiwa) and in view of Kyoto and optionally Moore and also over b) Hiraiwa in view of Fujiwara and Kyoto and optionally Moore. In addition, the claims stand rejected as allegedly unpatentable over Hiraiwa in view of Fujiwara, and Kyoto (and optionally Moore).

For the reasons already of record, applicants disagree with the rejections, e.g., that one of ordinary skill in the art would not be motivated to combine the teachings of the references as alleged. Nevertheless, to further the prosecution of the application, step a) of claim 1 has been amended to clarify that the silica-forming reactant gas comprises alkoxysilane. hydrogen gas, oxygen gas and that the fluorine compound gas may be selected from $SiF_4$, $CHF_3$ and $CF_4$.

None of the references teach or suggest the removal of the surface portion of the ingot prior to molding (i.e., step e). The references are particularly silent regarding removing the outer periphery of the ingot in an amount of at least 5% of the outer diameter and the opposite ends of the ingot each in an amount of at least 2.5% of the longitudinal length and at least 5% in total.

As noted in the specification at page 7- 8, the surface portion of the ingot has a fluorine concentration largely different from that of the central portion of the ingot. Removal of the ingot surface prior to shaping provides an ingot that has a minimalized distribution of fluorine concentration so that the effect of annealing is exerted throughout the ingot and bifringence of the ingot is smaller in proximity to the center.

Fujiwara discloses a first method of manufacturing silica glass utilizing the direct method, i.e., a method of hydrolyzing a silicon compound in an oxyhydrogen flame and depositing obtained fine glass particles on a target and simultaneously vitrifying the glass particles to obtain a silica glass ingot. Fujiwara also discloses a second method of manufacturing silica glass called VAD of soot methods, i.e., a method of hydrolyzing a silicon compound in an oxyhydrogen flame to obtain fine glass particles (soot), depositing

fine glass particles on a target to form porous glass (soot body), dehydrating the resultant porous glass, and consolidating the glass at a temperature corresponding to the softening point (preferably, melting point) or more to obtain a silica glass ingot.

Fujiwara does not teach or suggest a silica-forming reactant gas comprising alkoxysilane, hydrogen gas, oxygen gas and a fluorine compound gas selected from $SiF_4$, $CHF_3$ and $CF_4$

Furthermore, Fujiwara discloses three distinct heat stages. The first heating stage is at 1050° C. in a chlorine and helium atmosphere. The second heating stage is at 1250° C. in a silicon tetrafluoride and helium atmosphere. The third heating stage, corresponding to step d) of the present claims, is at 1,600° C. While the gas atmosphere of the first two heating stages is specifically disclosed, no gases are taught or suggested for the third heating stage. Thus, Fujiwara provides no motivation for one of skill in the art to perform a step d) of the present claims in any gas-containing atmosphere much less a fluorine gas containing atmosphere.

However, with regard to Fujiwara's lack of fluorine disclosure in step d, at page 7 of the Office Action, the Examiner states "it does not matter that Fujiwara does not teach what to do, the question is whether it would have been obvious and/or inherent." Just stating that a feature is inherent does not make it inherent. This allegation has no basis in the references. Fujiwara teaches a first step and states that the gas atmosphere is chlorine and helium and a second step where the gas atmosphere is silicon tetrafluoride and helium. Clearly, Fujiwara had to remove, purge and/or replace the gas between the first and second steps. The argument that fluorine gas may be lingering is simply speculation. Fujiwara explicitly identifies the specific gasses in the atmosphere of the first two heating stages. No atmosphere is identified in the third heating stage, thus, in context teaching one of ordinary skill in the art that no special gas-containing atmosphere is necessary or desired. In any event, the burden is on the PTO to show use of the recited gas is obvious in step d, and <u>not</u> on applicant to prove such use is non-obvious.

With regards to step e of the present claims, col. 13, lines 35-39 of Fujiwara provide the only discussion of the treatment of the ingot after heating and vitrifying.

"A member having a desired thickness was cut from the 260-mm diameter ingot obtained by the above method, thereby obtaining a measurement sample for optical characteristics. "

As noted above, no mention is made of removing the surface portion of the ingot prior to molding. Fujiwara is particularly silent regarding removing the outer periphery of the ingot

in an amount of at least 5% of the outer diameter and the opposite ends of the ingot each in an amount of at least 2.5% of the longitudinal length and at least 5% in total.

Hiraiwa fails to teach the introduction of fluorine gas at the start up (i.e., step a). Additionally, Haraiwa (as admitted by the Office Action) fails to teach the introduction of fluorine gas at step d. Also like Fujiwara, Hiraiwa is silent regarding the treatment of the ingot prior to molding. No mention or suggestion is made to remove the surface portion of the ingot. The reference is particularly silent regarding removing the outer periphery of the ingot in an amount of at least 5% of the outer diameter and the opposite ends of the ingot each in an amount of at least 2.5% of the longitudinal length and at least 5% in total. As noted above, removal of the ingot surface prior to shaping provides an ingot that has a minimalized distribution of fluorine concentration so that the effect of annealing is exerted throughout the ingot and bifringence of the ingot is smaller in proximity to the center.

Like Hiraiwa above, Kyoto does not teach or suggest the introduction of fluorine gas at start up (i.e., step a). Not only does Kyoto not teach step d of the present invention but, as previously discussed, Kyoto teaches away from step d. With respect to step e, like Fujiwara and Hiraiwa above, Kyoto is silent. There is no mention or discussion at all of the treatment of the ingot after vitrification.

Moore is "optionally cited" to teach doping during sintering. Moore teaches sintering at 1,480°C. The claims herein recite vitrifying occurs at 1,500°C to 1,700°C in a fluorine compound gas-containing atmosphere. Also, like the references discussed above, a step corresponding to step e of the present claims is not taught or suggested by Moore.

Yamagata does not disclose the introduction of fluorine gas to the starting material gas. Yamagata is entirely lacking steps corresponding to steps d, e and f of the present invention. Thus, this reference does not cure the deficiencies of the references discussed above.

At page 5 of the Office Action, the Examiner states "one cannot show non-obviousness by attacking the references individually where the rejections are based on combinations of references." However, no matter what combination of the references is considered, the references

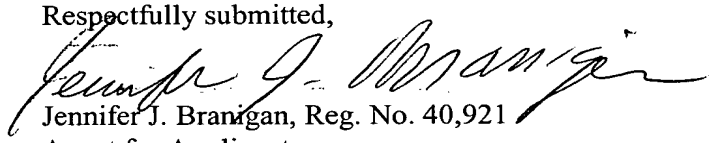
fail to teach or even suggest all of the elements of the claimed invention. It is not just Fujiwara that fails to teach or suggest a process for producing fluorine containing synthetic quartz having the specific features specified in applicants' claims. Hiraiwa, Yamagata, Kyoto and Moore add nothing to the teachings of Fujiwara. Like Fujiwara they are silent regarding heating to 1,500°C to 1,700°C and vitrifying the porous silica matrix in a fluorine compound gas-containing atmosphere (corresponding to step d). Additionally, they are silent regarding removal of the surface of the ingot (i.e, corresponding to step e) prior to heating and molding (i.e., corresponding to step f). Thus, even a combination of the teachings of Hiraiwa, Fujiwara, Yamagata, Kyoto and Moore would not lead one skilled in the art to arrive at the present invention. . The combination of references, as cited by the Examiner, cannot render the present invention unpatentable because there is no teaching or suggestion of the features of the present invention within these references and there is no motivation to make the modifications required to arrive at Applicants' invention. In arriving at these rejections, the Examiner impermissibly uses hindsight and Applicants' invention as the suggestion for combining the references. See *In re Gorman*, 18 USPQ2d 1885 (Fed. Cir. 1991). Therefore, in considering the prior art as a whole, one of skill in the art would not be motivated to make the combination, as suggested by the Examiner.

Thus, the rejections under 35 U.S.C. § 103 should be withdrawn.

Reconsideration is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,



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